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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

EHNE, CHARLES

ART UNIT	PAPER NUMBER
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2113

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Please find below and/or attached an Office communication concerning this application or proceeding.

6

Office Action Summary	Application No. 10/719,286	Applicant(s) FUJIBAYASHI, AKIRA	
	Examiner Charles Ehne	Art Unit 2113	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-4, 6-10 and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burton (2004/0236983) taken in view of Micka (6,611,901).

As to claim 1, Burton discloses a system having a primary storage volume having first data stored thereon and a secondary storage volume having second data stored thereon, the primary storage volume coupled to the secondary storage volume by a communications link, a method of restoring data after a suspension of the link, the method comprising:

tracking updates to the first data and updates to the second data after suspension of the link (Page 4, ¶ 0048, lines 2-7);

revising the image of the first data to account for the updates to thereby provide a complete first data image for use when the link is restored (Page 4, ¶ 0046);

revising the image of the second data to account for the updates to thereby provide a complete second data image for use when the link is restored (Page 4, ¶ 0046); and

copying data between the primary volume and the secondary volume when the link is restored to thereby resynchronize the primary volume and the secondary volume (Page 4, ¶ 0047, lines 1-5).

However Burton fails to disclose maintaining a first image of the first data stored on the primary volume and maintaining a second image of second data stored on the secondary volume.

Micka discloses a system for maintaining electronic data at a point in time (Abstract, lines 1-2). Micka does disclose maintaining a first image of the first data stored on the primary volume and maintaining a second image of second data stored on the secondary volume (column 5, lines 25-29).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to implement Micka's system for maintaining an image of the data stored on a volume with Burton's method of tracking, revising and copying data between a primary volume and a secondary volume. Since Burton's controllers are operating indendently at a time where no communication is possible, each controller would be creating a copy of its own backup of a particular point in time. A person of ordinary skill in this art at the time of invention would have been motivated to make this modification

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because a point in time copy is a copy of data consistent as of a particular point in time, and would not include updates to the data that occur after the point in time, this provides data duplication and disaster recovery (Micka: column 1, lines 14-21).

As to claim 2, Micka discloses the method as in claim 1 wherein the step of maintaining an image comprises on at least one of the primary storage volume and the secondary storage volume:

creating a bitmap table to record a status of all of the data on the volume (column 5, lines 43-46);

establishing a reserved area for storage of the data (column 5, lines 27-29); and copying all of the data to the reserved area (column 5, lines 21-25).

As to claim 3, Micka discloses the method as in claim 1 wherein the step of maintaining an image comprises on at least one of the primary storage volume and the secondary storage volume comprises maintaining a record of a log sequence number at the time of suspension of the link (Figure 2.38, column 6, lines 8-12).

As to claim 4, Micka discloses the method as in claim 1 wherein the step of maintaining an image comprises creating an old data table to maintain a record of all of the data at the time of suspension of the link (column 5, lines 43-46).

As to claim 6, Burton discloses the method as in claim 1 wherein the step of tracking updates comprises on at least one of the primary storage volume and the secondary storage volume recording updates to the data as a record of the log sequence numbers occurring after suspension of the link (Page 2, ¶ 0023, lines 8-10).

As to claim 7, Burton discloses a system for restoring data after an interruption in a communications link comprising:

a primary storage volume having first data stored thereon (Figure 1.150, Page 4, ¶ 0038, lines 1-3);

a secondary storage volume having second data stored thereon, the primary storage volume being coupled to the secondary storage volume by the communications link (Figure 1.152, Page 4, ¶ 0038, lines 1-3 & Page 3, ¶ 0036, lines 18-21);

the first storage controller revising the image of the first data to account for the updates to thereby provide a complete first data image for use when the link is restored (Page 4, ¶ 0046 & ¶ 0047);

the second storage controller revising the image of the second data to account for the updates to thereby provide a complete second data image for use when the link is restored (Page 4, ¶ 0046 & ¶ 0047); and

at least one of the first and the second storage controllers revising the data on the secondary storage volume to match the data on the primary storage volume after the link is restored (Page 5, ¶ 0054 & ¶ 0055).

Burton discloses a first and second controller (Figure 1.20 & 1.22), but fails to disclose:

a first storage controller for maintaining a first image of the first data stored on the primary volume upon the interruption in the communications link;

a second storage controller for maintaining a second image of the second data stored on the secondary volume upon the interruption in the communications link;

a first update storage for storing updates to the first data after the interruption in the communications link; and

a second update storage for storing updates to the second data after the interruption in the communications link.

Micka discloses a system for maintaining electronic data at a point in time (Abstract, lines 1-2). Micka does disclose:

a first storage controller for maintaining a first image of the first data stored on the primary volume upon the interruption in the communications link (column 5, lines 25-35);

a second storage controller for maintaining a second image of the second data stored on the secondary volume upon the interruption in the communications link (column 5, lines 25-35);

a first update storage for storing updates to the first data after the interruption in the communications link (column 5, lines 25-29); and

a second update storage for storing updates to the second data after the interruption in the communications link (column 5, lines 25-29).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to implement Micka's system for maintaining an image of the data stored on a volume with Burton's method of tracking, revising and copying data between a primary volume and a secondary volume. Since Burton's controllers are operating indendently at a time where no communication is possible, each controller would be creating a copy of its own backup of a particular point in time. A person of ordinary skill

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in this art at the time of invention would have been motivated to make this modification because a point in time copy is a copy of data consistent as of a particular point in time, and would not include updates to the data that occur after the point in time, this provides data duplication and disaster recovery (Micka: column 1, lines 14-21). By providing a duplicated copy of the original data a rollback process would allow recovery in case of a fault or failure during the re-synchronizing process.

As to claim 8, Micka discloses the system as in claim 7 wherein first storage controller maintains an image of the primary storage volume upon interruption of the link by creating a bitmap table to record a status of all of the data on the volume (column 5, lines 43-46), establishing a reserved area for storage of the data (column 5, lines 27-29); and copying all of the data to the reserved area (column 5, lines 21-25).

As to claim 9, Micka discloses the system as in claim 7 wherein the storage controllers store on a selected volume an image of the volume by maintaining a record of a log sequence number at the time of suspension of the link (Figure 2.38, column 6, lines 8-12).

As to claim 10, Micka discloses the system as in claim 7 wherein the storage controllers create an old data table to maintain a record of all of the data at the time of suspension of the link (column 5, lines 43-46).

As to claim 12, Burton discloses a sub-system for restoring data after an interruption in a communications link comprising:

a primary storage volume having first data stored thereon (Figure 1.150 & 2.208, Page 4, ¶ 0038, lines 1-3);

a first update storage for storing updates to the first data after the interruption in the communications link (Page 4, ¶ 0041, lines 3-8); and

the first storage controller revising the image of the first data to account for the updates to thereby provide a complete first data image for use when the link is restored (Page 4, ¶ 0046 & ¶ 0047).

Burton discloses a first controller, but fails to disclose wherein the first storage controller maintains a first image of the first data stored on the primary volume upon the interruption in the communications link.

Micka discloses a system for maintaining electronic data at a point in time (Abstract, lines 1-2). Micka does disclose wherein the first storage controller maintains a first image of the first data stored on the primary volume upon the interruption in the communications link (column 5, lines 25-29).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to implement Micka's system for maintaining an image of the data stored on a volume with Burton's method of tracking, revising and copying data between a primary volume and a secondary volume. A person of ordinary skill in this art at the time of invention would have been motivated to make this modification because a point in time copy is a copy of data consistent as of a particular point in time, and would not include updates to the data that occur after the point in time, this provides data duplication and disaster recovery (Micka: column 1, lines 14-21).

As to claim 13, Micka discloses the sub-system as in claim 12 wherein the first storage controller maintains an image of the primary storage volume upon interruption

of the link by creating a bitmap table to record a status of all of the data on the volume (column 5, lines 43-46), establishing a reserved area for storage of the data (column 5, lines 27-29); and copying all of the data to the reserved area (column 5, lines 21-25).

As to claim 14, Micka discloses the sub-system as in claim 12 wherein the first storage controller stores on a selected volume an image of the volume by maintaining a record of a log sequence number at the time of suspension of the link (Figure 2.38, column 6, lines 8-12).

As to claim 15, Micka discloses the sub-system as in claim 12 wherein the first storage controller creates an old data table to maintain a record of all of the data at the time of suspension of the link (column 5, lines 43-46).

Claims 5,11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burton and Micka as applied to claims 1, 7 and 12 above, and further in view of Crockett.

As to claims 5,11 and 16, the combination of Burton and Micka disclose a system wherein updates while a suspension of the communication link are tracked by timestamps and stored in a queue (Burton: Page 2, ¶ 0023, lines 8-10). The combination of Burton and Micka fail to disclose wherein the storage controllers each create a bitmap table to record all blocks of data which are updated after suspension of the link.

Crockett discloses a method for assuring consistency between a primary volume and a remote secondary volume (Abstract: lines 1-2). Crockett does disclose wherein

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the storage controllers each create a bitmap table to record all blocks of data which are updated after suspension of the link (column 11, lines 3-5).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to implement Crockett's bitmap table in place of Burton's queue. A person of ordinary skill in this art at the time of invention would have been motivated to make this modification because a bit map is a Boolean coded status list of the data blocks and indicates whether a block was updated or remains unmodified during a suspension of the communication link (Crockett: columns 10-11, lines 67-2).


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Ehne whose telephone number is (571)-272-2471. The examiner can normally be reached on Monday-Friday 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Beausoliel can be reached on (571)-272-3645. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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